



SAAGA Packhouse Productivity Study

Introduction

Packhouses are the unsung heroes in the avocado value adding chain. A well run packhouse with good management can be a real jewel for any farming operation.

This pioneering study was commissioned by SAAGA to establish a benchmark for the avocado packing industry.

The primary objective of this pilot study is to determine the current level of packhouse productivity in the local avocado industry in the Northern portion of the country. This will serve as a benchmark for future study.

Prior to this study there was no idea if smaller packing facilities were perhaps more efficient than certain of the larger ones.

Productivity can be measured in several ways. The one chosen was kilograms per shift hour, which is determined as follows:

The volume packed per day (in kilograms) ÷ (the number of staff × the numbers of hours worked per day)

This unit of measure accounts for not only volume, but the number of “hands” that it took to pack the fruit and how long it took to pack. The number of staff and hours worked remains relevant in this measure, despite electronic sorting, which should reduce the labour required.

Scope of the study

The study focused on packhouses in the northern and eastern parts of South Africa.

It includes information from thirteen packhouses. There were three packhouses in each category, apart from the “large” category which had four packhouses. The size of the operations can be divided into the following four categories based on annual volume packed:

- Micro
- Small
- Medium
- Large

All data pertains to the 2024 packing season and information is aggregated to ensure confidentiality.

Down time is directly related to productivity. Down time refers to the packing time lost due to a variety of factors i.e. mechanical breakdowns and unplanned or unforeseen events. An attempt was made to obtain a clearer idea of the challenges faced in this regard.

The unit of measure used was the number of hours of lost production on a weekly basis.

Results

It is interesting to note that certain cultivars pack at a faster tempo than others. For example, Hass and Hass-like fruit which is round can be packed faster than others with long necks. Average figures were thus used.

Packhouses varied from small and basic to the very sophisticated large operations. Similarly, productivity monitoring showed parallel trends. From real time productivity monitoring to just “winging it”.

Average Productivity Factors

Packhouse	Average Figures					
	Staff number	Hour worked per day	Shift Hours	KG per shift hour	Volume tons PA	Tons per week
Micro	43	8	730	43	650	76
Small	85	9	768	39	1898	101
Medium	104	10	965	74	5365	300
Large	152	10	1491	103	17093	558

The fact that these figures are averages may give the impression that there is a calculation error, but this is not the case.

Certain facets are obvious, for instance, larger packhouses usually employ more staff and have longer working hours.

Bear in mind the term shift hour refers to the number of staff multiplied by the hours worked in a day. For example, a packhouse with 40 staff members who work for 8 hours per day would register at 320 shift hours. Hence the number of kilograms packed per day is then divided by the daily shift hours to calculate the kilograms per shift hour. In other words, shift hour refers to the number of kilograms that a full packing team can handle within the space of an hour. It needs to be stated that this figure is relevant regardless of whether or not electronic sorting is employed.

On average productivity ranges from 43 kilograms per shift hour to 103 kilograms per shift hour. There is one anomaly which is the productivity figure for small packhouses which is lower than micro packhouses. The reason probably lies with the fact that their staff numbers are double that of the micro packhouse. Expressed differently, smaller packing operations can achieve favourable productivity figures by having fewer staff.

Correlation Analysis

Correlation analysis is a statistical measure which shows the strength or weakness of association between two variables. If the correlation value is 1,0 then there is a perfect relationship i.e. if the one variable rises by for example 10 then the second variable will also move to the same extent. These two variables are then perfectly correlated. If the correlation statistic is zero, then there is no relationship between the variables.

Correlation Matrix

	<i>Staff Number</i>	<i>Hr per day</i>	<i>Shift Hr</i>	<i>KG per shift hr</i>	<i>Volume tons PA</i>	<i>Tons per week</i>
Staff Number	1					
Hr per day	0,52	1				
Shift Hr	0,91	0,41	1			
KG per shift hr	0,58	0,54	0,49	1		
Volume tons PA	0,66	0,74	0,63	0,86	1	
Tons per week	0,79	0,75	0,73	0,89	0,92	1

The table shows the extent of the strength between what has already been observed. For example, larger packhouses work longer hours, have more staff and have better productivity and greater volume throughput. The strength of the above correlations is strong.

Down Time Results

Down time refers to factors which result in a loss of packing time. Some are manageable and some unforeseen.

The extent of down time increases from micro to medium packhouses. Interesting to note the fact that large packhouses tend to have lower down time.

Average Downtime and Causes

Packhouse	Down Time Hr/Week	Percentage Down Time Factors							
		Power Out	No Cartons	No Stickers	Meetings	Change of Farm	No Fruit	Change Cultivar	Mechanical
Micro	9	10	0	0	0	10	60	5	15
Small	10	12	2	0	0	2	46	6	32
Medium	14	9	5	0	9	16	19	10	32
Large	5	1	8	1	15	22	15	13	26

Reasons for the loss of production time and trends are discussed below:

- Power Outages – Tend to be more problematic in smaller packing operations. Whilst load shedding can be pre-emptively accommodated, the unplanned and unreliable source of power is problematic. Even if generators are capable of supplying power, time is lost. Restarting machinery disrupts packing rhythm. It is also not pleasant being dumped into darkness in such an event.
- No Cartons – is something that should be manageable, unless it is of a mechanical nature.
- No Stickers – as above.
- Meetings – Larger operations appear to lose more time holding staff meetings.
- Change of cultivar and change of farm - are more problematic in larger packing facilities due to packing for several farming operations and outside growers. To maintain integrity (ownership) and product identification the packing line must be cleared and carton identification changed between different growers.
- No Fruit - is something that plagues smaller operations. A lack of fruit can halve the productivity figure of a reasonable sized packhouse. Rain can also cause packing to cease. Good planning and having adequate fruit available to draw from, is the lifeblood of a successful packing facility.
- Mechanical breakdowns are prevalent throughout the range of packing facilities and account for almost one third of the down time experienced. Packing equipment is expensive and numerous operations are pushing old equipment to the limit. Breakdowns are therefore inevitable.

Conclusion

Several of the challenges experienced by packhouses are common to all. The extent of these differs between size and complexity of the packing operation.

Whilst this is a pilot study, it sheds light on the packing industry and provides a useful indication of productivity levels and downtime factors.

Future study could include factors such as the following:

- Line layout – is a straight packing line better than one with twists and turns?
- Does electronic sorting really improve productivity?
- A potential packhouse study group where detailed information could be shared between willing packhouses. The potential positive spin-offs for packhouses to learn from each other could be substantial.
- Can efficiency be improved by good management skills and staff involvement / “buy in” / colours and incentives?
- How has productivity changed over time?

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